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CLAIMS

1. The use of a coating composition comprising:
(a) from about 5 to about 50 weight percent solids, the solids comprising from about 10 to about 70 weight percent silica and from about 90 to about 30 weight percent of a partially polymerized organic silanol of the general formula $RSi(OH)_3$, wherein R is selected from methyl and up to about 40% of a group selected from the group consisting of vinyl, phenyl, gamma-glycidoxypropyl, and gamma-methacryloxypropyl, and
(b) from about 95 to about 50 weight percent solvent, the solvent comprising from about 10 to about 90 weight percent water and from about 90 to about 10 weight percent lower aliphatic alcohol,
wherein the coating composition has a pH of from about 3.0 to about 8.0,
for the purpose of improving the surface smoothness of a polymeric substrate, wherein the surface of said coated substrate exhibits an Ra value of less than 0.6 nm, and/or an Rq value of less than 0.8 nm.

2. A use according to claim 1 wherein the pH of the coating composition is in the range 3.0 to 6.5.

3. A use according to claim 1 wherein the pH of the coating composition is about 6.0.

4. A use according to any preceding claim wherein said substrate is a polyester film.

5. The use of claim 4 wherein said substrate is a poly(ethylene naphthalate) or poly(ethylene terephthalate) film.

6. The use according to claim 4 wherein the polyester is derived from 2,6-naphthalenedicarboxylic acid.

7. A use according to claim 6 wherein the poly(ethylene naphthalate) has an intrinsic viscosity of 0.5 – 1.5.

8. The use of any of claims 1 to 7 wherein said substrate is a heat-stabilised, heat-set, oriented film.

9. The use of any preceding claim wherein said substrate has a shrinkage at 30 mins at 230°C of less than 1%.

10. The use of any preceding claim wherein said substrate has a residual dimensional change ΔL_r measured at 25°C before and after heating the film from 8°C to 200°C and then cooling to 8°C, of less than 0.75% of the original dimension.

11. The use of any preceding claim wherein said substrate is a heat-stabilised, heat-set, oriented film comprising poly(ethylene naphthalate) film having a coefficient of linear thermal expansion (CLTE) within the temperature range from –40 °C to +100 °C of less than 40×10^{-6}/°C.

12. A use according to any preceding claim wherein said heat-stabilised film has a % of scattered visible light (haze) of <1.5%.

13. A use according to any preceding claim wherein said heat-stabilised film is biaxially oriented.

14. A use according to any preceding claim in the manufacture of an electronic or opto-electronic device containing a conjugated conductive polymer and comprising said substrate.

15. A use according to claim 14 wherein said device is an electroluminescent display device.

16. A use according to claim 14 wherein said device is an organic light emitting display (OLED) device.

17. A composite film comprising a heat-stabilised, heat-set, oriented polyester substrate and a coating layer, wherein the coating layer is derived from the coating

composition recited in any of claims 1 to 3, and wherein the surface of said coated substrate exhibits an Ra value of less than 0.6 nm, and/or an Rq value of less than 0.8 nm.

18. A composite film according to claim 17 wherein said polyester is a poly(ethylene naphthalate) film.

19. A composite film according to claim 17 or 18 wherein said substrate exhibits one or more of the following characteristics:
(i) a shrinkage at 30 mins at 230°C of less than 1%; and/or
(ii) a residual dimensional change ΔL_r measured at 25°C before and after heating the film from 8°C to 200°C and then cooling to 8°C, of less than 0.75% of the original dimension; and/or
(iii) a coefficient of linear thermal expansion (CLTE) within the temperature range from –40 °C to +100 °C of less than 40×10^{-6}/°C; and/or
(iv) a % of scattered visible light (haze) of <1.5%.

20. A composite film comprising a heat-stabilised, heat-set, oriented poly(ethylene naphthalate) substrate, and a coating layer; wherein said substrate exhibits one or more of:
(i) a shrinkage at 30 mins at 230°C of less than 1%; and/or
(ii) a residual dimensional change ΔL_r measured at 25°C before and after heating the film from 8°C to 200°C and then cooling to 8°C, of less than 0.75% of the original dimension; and/or
(iii) a coefficient of linear thermal expansion (CLTE) within the temperature range from –40 °C to +100 °C of less than 40×10^{-6}/°C;
and wherein the surface of said coated substrate exhibits an Ra value of less than 0.6 nm, and/or an Rq value of less than 0.8 nm.

21. A composite film according to any of claims 17 to 20 further comprising a barrier layer.

22. A composite film according to claim 21 which exhibits a water vapour transmission rate of less than 10^{-6}g/m^2/day and/or an oxygen transmission rate of less than 10^{-5}/mL/m^2/day.

23. A method of manufacture of a coated polymeric film which comprises the steps of:
(i) forming a substrate layer comprising poly(ethylene naphthalate);
(ii) stretching the layer in at least one direction;
(iii) heat-setting under dimensional restraint at a tension in the range of about 19 to about 75 kg/m of film width, at a temperature above the glass transition temperature of the polyester but below the melting temperature thereof;
(iv) heat-stabilising under a tension of less than 5 kg/m of film width, and at a temperature above the glass transition temperature of the polyester but below the melting temperature thereof; and
(v) applying a planarising coating composition thereto such that the surface of said coated substrate exhibits an Ra value of less than 0.6 nm, and/or an Rq value of less than 0.8 nm.

24. A method of manufacture of an electronic or opto-electronic device containing a conjugated conductive polymer and a substrate as described herein, said method comprising the steps of:
(i) forming a substrate layer comprising poly(ethylene naphthalate);
(ii) stretching the layer in at least one direction;
(iii) heat-setting under dimensional restraint at a tension in the range of about 19 to about 75 kg/m of film width, at a temperature above the glass transition temperature of the polyester but below the melting temperature thereof;
(iv) heat-stabilising under a tension of less than 5 kg/m, and at a temperature above the glass transition temperature of the polyester but below the melting temperature thereof;
(v) applying a planarising coating composition thereto such that the surface of said coated substrate exhibits an Ra value of less than 0.6 nm, and/or an Rq value of less than 0.8 nm; and
(vi) providing the coated, heat-stabilised, heat-set, oriented film as a substrate in the device.

25. A method according to claim 24 further comprising providing on a surface of the coated substrate a barrier layer.

26. A method according to claim 25 wherein the composite film comprising said coated substrate and barrier layer exhibits a water vapour transmission rate of less than 10^{-6}g/m^2/day and/or an oxygen transmission rate of less than 10^{-5}/mL/m^2/day.